The Economic Design of x-bar Control Charts under Preventive Maintenance

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ABSTRACT

The economic design of traditional x-bar control charts generally takes less consideration of preventive maintenance. While some economic design of x-bar control charts when considering the preventive maintenance conducts a preventive maintenance at each sampling. Based on Duncan ’ s (1956) economic design mode, this study assumed that preventive maintenance is carried out only when the sample statistics falls into the scope between the warning and the action limits to reduce unnecessary maintenance action to establish the economic model of x-bar control charts. Hooke and Jeeves search method was used to obtain the optimized design parameters combination of the number of samples (n), sampling intervals (h) and the width of control limits (k) for the lowest unit time cost E (L). The numerical example was used to illustrate the model ’ s working and it showed that the unit time costs of control charts can be reduced when taking the preventive maintenance into consideration. Meanwhile, the sensitive analysis showed that the occurrence rate (λ 0)and extra-cost(M)when process is out of control are the significant parameters to the control chart design.

Keywords : x-bar Control Charts ; Economic Design ; Preventive Maintenance

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